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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 13

Application Number: 08/881,948
Filing Date: June 25, 1997
Appellant(s): Strauss et al.

Thomas W. Humphrey
For Appellant

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GROUP 1100

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed May 21, 1999.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

Art Unit: 1753

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 9-13, 23 and 24 stand or fall together because appellant's brief includes a statement that this grouping of claims stands or falls together.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

5,244,556	Inoue	9-1993
5,112,467	Zeida	5-1992

Art Unit: 1753

59-179784	Fujitsu	10-1984
2,173,217	Wegmann et al.	10-1986

(10) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

Claims 9 and 23 are rejected under 35 U.S.C. 103 as obvious over Fujitsu (Japan 59-179784) in view of Zejda (U.S. Pat. 5,112,467). This rejection is set forth in prior Office action, Paper No. 9 and is set forth below.

Fujitsu teach in a sputtering device for forming thin film on a substrate by applying direct current of high voltage on the target in a magnetron, the target is attached to a water cooling backing plate by screws with a metal sheet between them. (See abstract)(Applies to claims 9 and 23)

In Figure 2, the target 11 has a generally disk shaped surface having two planar surfaces and a cylindrical outer periphery manufactured of sputtering material. The target has at least one radially-inward step proximate the outer periphery as seen in Figure 2. The target is manufactured of a single material. Holes are provided in proximity to the targets outer periphery to allow screws to attach the target to the backing plate. (See Figure 2)(Applies to claims 9 and 23)

The differences between Fujitsu and the present claims is that the threaded holes in the target are not discussed.

Art Unit: 1753

Zejda teach a cathode sputtering apparatus provided with a quick disconnect mechanism for rapid replacement of a target. (See Abstract)(Applies to claims 9 and 23)

In Fig. 1 there is illustrated an upper portion 19 of a cathode chamber on which is received an annular target unit. As illustrated, the target unit comprises a target 1 and a target base plate 2, the base plate 2 serving as a target holder. (Column 2 lines 59-65)(Applies to claims 9 and 23)

The target 1 and base plate 2 are secured together by means of screw bolts 14. The upper portion 19 essentially comprises the cover of the cathode chamber. (Column 2 lines 66-68) From Fig. 1 threaded holes are provided in order for the threaded screw to secure the target to the holder. (See Fig. 1)(Applies to claims 9 and 23)

The motivation for utilizing screws to secure a target is that it is desired to provide a target with rapid replacement. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a target having a generally disk-shaped section having two generally planar surface and an outer periphery, the generally disk-shaped section having at least one radially-inward step proximate the outer periphery, manufactured out of a single material, and providing holes in the outer periphery of the target as taught by Fujitsu and to have provided threaded holes in a target so screws can secure the target to a holder as taught by Zejda because it is desired to provide a target which can be replaced rapidly.

Art Unit: 1753

Claims 10-13 are rejected under 35 U.S.C. 103 as obvious over Fujitsu in view of Zejda as applied to claims 9 and 23 above, and further in view of Inoue (U.S. Pat. 5,244,556). This rejection is set forth in prior Office action, Paper No. 9 and is set forth below.

The differences not yet discussed is exposing one side of the target to vacuum pressure while the other side is not exposed to vacuum pressure and the materials of the sputtering target.

Inoue teach in Fig. 2 an example of target in which solder, a brazing filler metal having a low melting point is not used. Referring to Fig. 2, the target plate 31 is directly mounted on the flange 3a of the support frame 3b by respective screws 17a and 17b via the sealing member 4 (the O-ring). Thus, the target plate 31 is directly cooled by cooling water (the heat exchanging medium). (Column 2 lines 31-37)(Applies to claims 10-13)

Inoue also suggest that target materials for a target can be aluminum, one of the metals titanium, zirconium, tungsten, molybdenum, gold, tantalum, niobium, palladium, manganese, silver, zinc, ruthenium, and tellurium, an alloy in which at least one of the above metals is the chief ingredient, chromium, nickel, a chromium alloy, a nickel alloy, magnetic metals such as permalloy, a silicon alloy of one of the metals titanium, tungsten and molybdenum, silicon, and an oxide of any of the above materials. (Column 7 lines 62-68; Column 8 lines 1-5)(Applies to claims 10-13)

The motivation for exposing one side of the target to vacuum pressure and the other side not being exposed to vacuum pressure is that it is desired to directly cool the target and the

Art Unit: 1753

motivation for forming a target out of different materials is that it is desired to sputter different materials on a substrate. (Column 2 lines 31-37; Column 7 lines 62-68; Column 8 lines 1-5)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to expose one side of a target to a vacuum while the other side is not exposed to a vacuum and to have made a target out of different materials as taught by Inoue because it is desired to cool a target and deposit different materials on a substrate.

Claim 24 is rejected under 35 U.S.C. 103 as obvious over Fujitsu in view of Zejda as applied to claims 9 and 23 above, and further in view of Wegmann et al. (GB 2,173,217). This rejection is set forth in prior Office action, Paper No. 9 and is set forth below.

The differences not yet discussed is two radially inward steps in the target.

Wegmann teach in Fig. 5 a target plate 1 having on its outer periphery a cooling lip 12 with which may be associated holding means. Additionally are provided further cooled clamping rings 14 of a smaller diameter the cooling surfaces of which bear onto a cooling rib 15 on the lower side of the target plate 1. (Page 2 lines 52-61)(Applies to claim 24)

The motivation for providing two stepped surfaces on a target surface is that it is desired to cool the target. (Page 2 lines 52-61)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided two stepped surfaces as taught by Wegmann et al. because it is desired to cool the target.

Art Unit: 1753

(11) *Response to Argument*

In response to the argument that one of ordinary skill in the art, whether or not referencing Zejda, would not put threads in the holes of the target shown by Fujitsu because doing so would not only be pointless but counterproductive because it would make it harder to obtain good mechanical engagement between the Fujitsu target and chamber, it is argued that Applicant alleges that tight mechanical engagement cannot be achieved if threaded holes are provided in Fujitsu's target, however, providing threaded holes can still achieve a tight mechanical fit if screwed properly and Zejda provides that the motivation for providing threaded screw holes in a target allows for securing of a target that is capable of rapid replacement. (See Fujitsu and Zejda discussed above)

In response to the argument that Fujitsu and Zejda would not be combined because such devices are designed for radically different applications (i.e. magnetron vs. non-magnetron sputtering), it is argued that the sputtering targets of Zejda and Fujitsu can be utilized for both magnetron and non-magnetron sputtering. Zejda simply suggests threaded holes for securing a target to a backing plate to allow for rapid replacement of a target. (See Zejda and Fujitsu discussed above)

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the

Art Unit: 1753

time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation for combining Zejda with Fujitsu is that Zejda suggest that utilization of screw holes and screws allows for securement of a target and for rapid replacement. The motivation for combining Inoue with Fujitsu and Zejda is that it is desired to cool the target and form the target out of different target materials. The motivation for combining Wegmann with Fujitsu is that two stepped surfaces allow for cooling of the target surface. (See Fujitsu, Zejda, Inoue and Wegmann discussed above)

In response to the argument that Inoue actually teaches away from a single-material target, rather than teaching toward one as the Examiner supposes, it is argued that Inoue suggest materials of targets and exposing one side of a target to vacuum pressure while the other is not exposed to vacuum pressure. Fujitsu was relied upon to suggest a single material target. (See Inoue and Fujitsu discussed above)

Art Unit: 1753

In response to the argument that Wegmann does not teach the concepts absent from Fujitsu, Zejda or Inoue, it is argued that Wegmann on page 2 lines 52-61 was relied upon teach two radially inward steps. (See Wegmann discussed above)

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Rodney McDonald
Art Unit 1753
RODNEY MCDONALD
PATENT EXAMINER

RM
July 19, 1999

Conferee: Mark Se

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